AGENCY OF NATURAL RESOURCES

DEPARTMENT OF FORESTS, PARKS AND RECREATION

STATE OF VERMONT

FOREST INSECT AND DISEASE CONDITIONS

SOUTHERN REGION

CALENDAR YEAR 1990

PREPARED BY: Barbara S. Burns, Specialist
Forest Resource Protection

John P. Barrows
Nathan J. Fice
Allan D. Sands
Forest Resource Protection
Technicians

INTRODUCTION

The information in this report is based on aerial surveys to detect defoliation, dieback and mortality; as well as ground surveys and observations of Forest Resource Protection personnel and other forestry staff.

Aerial surveys were flown in early June (6/5, 6/6, 6/12), mid-July (7/11, 7/12, 7/17), and late August (8/20, 8/22).

Diagnostic assistance was provided by the University of Vermont, Maine Forest Service, Pennsylvania State University, Connecticut Agricultural Experiment Station, Cornell University, and the U. S. Forest Service.

WEATHER SUMMARY

The winter of 1989-90 began with below zero temperatures in December, before much snow had accumulated. Winterburn showed up throughout the region as a result of these conditions.

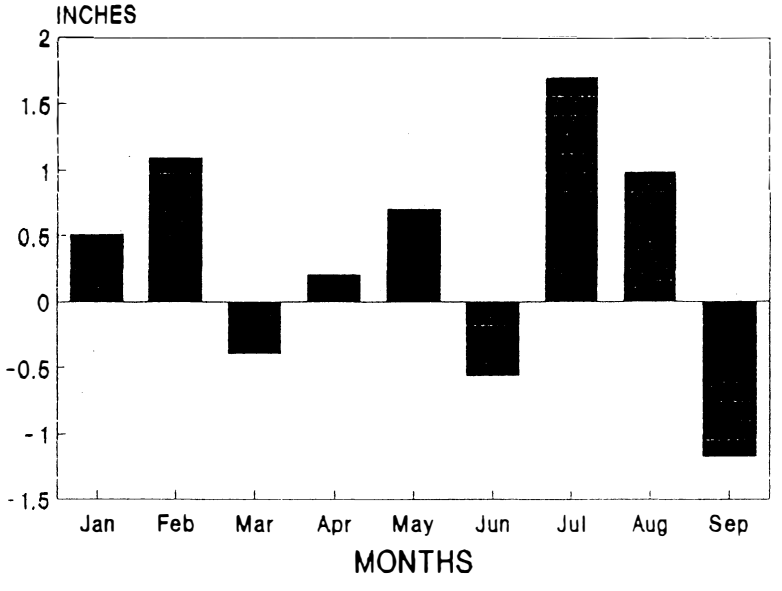
Spring began all at once in the southern part of the region, with temperatures in the 90's in late April. Further north, bud development began in late April, but slowed down with cool, wet weather in May. June and August had periods of rainy weather as well, resulting in another year of widespread fungus diseases.

Autumn foliage was bright, but was knocked off early by heavy winds and rain. Killing frosts did not occur until late October in parts of the region.

1990 was a good year for acorn production. Scattered white pines had an unusually heavy crop of cones.

Weather for the season is summarized in Figure 1. Phenology observations are summarized in Table 1.

Figure 1. 1990 Weather Summary: Burlington International Airport. Data from NOAA Monthly Climatological Data: Monthly Summary.



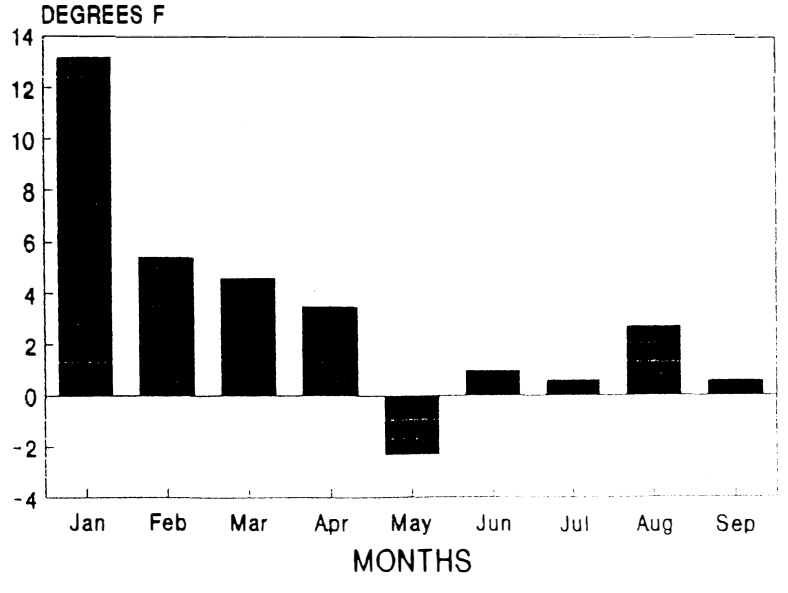


Table 1. 1990 Growing Degree Days and Observations of Phenological Development.

Growing Degree Days*			Phenology**				
Burlington	Albany		Sugar	Other Plants			Misc.
1990	1990	(Normal)	Maple	Budswell	Leaves	Flowers	
4/9	139					Popple Silver Maple	
4/16	139			No change			
4/23	143				Willow Cherry	Red Maple	
4/30	166	241	(167)	Leaves	Oak	Popple	Birch	Eastern Tent Caterpillar
5/7	218	296	(242)			Beech Oak	Oak	
5/14	261	352	(318)		W. Spruce Cottonwood	W. Pine	Apple	Gyspy Moth
5/21	307	410	(393)	Full Size		Hickory Ash		
5/28	360	474	(469)		Hemlock			Thrips Immatures
6/4	457	584	(570)			Hemlock		
6/11	543	685	(691)		Full Green Up			

* 86/50 calculations from UVM Entomology & Plant Pathology News or based on NOAA Local Climatological Data.

** Observations from southest Windsor County.

FOREST INSECTS

Hardwood Defoliators

Cherry Scallop Shell Moth, *Hydria prunivorata*, caused damage to cherries throughout the region. Heavy damage was observed in southern Windham and Bennington Counties. Towns with the heaviest damage included Bennington, Readsboro, Whitingham, Wilmington, and Woodford. Hillsides with a high relative stocking of cherry appeared brown.

Forest Tent Caterpillar, *Malacosoma disstria*, numbers declined from 1989, with only scattered individual larvae observed. Moth catches in pheromone traps were also down. Trap catch data will be included in the statewide report.

Gypsy Moth, *Lymantria dispar*, defoliation increased with 47,ØØØ acres mapped during aerial surveys, compared to 15,5ØØ acres in 1989. Most of the damage occurred in Bennington and Rutland Counties (Table 2, Map 1). Affected trees refoliated quickly.

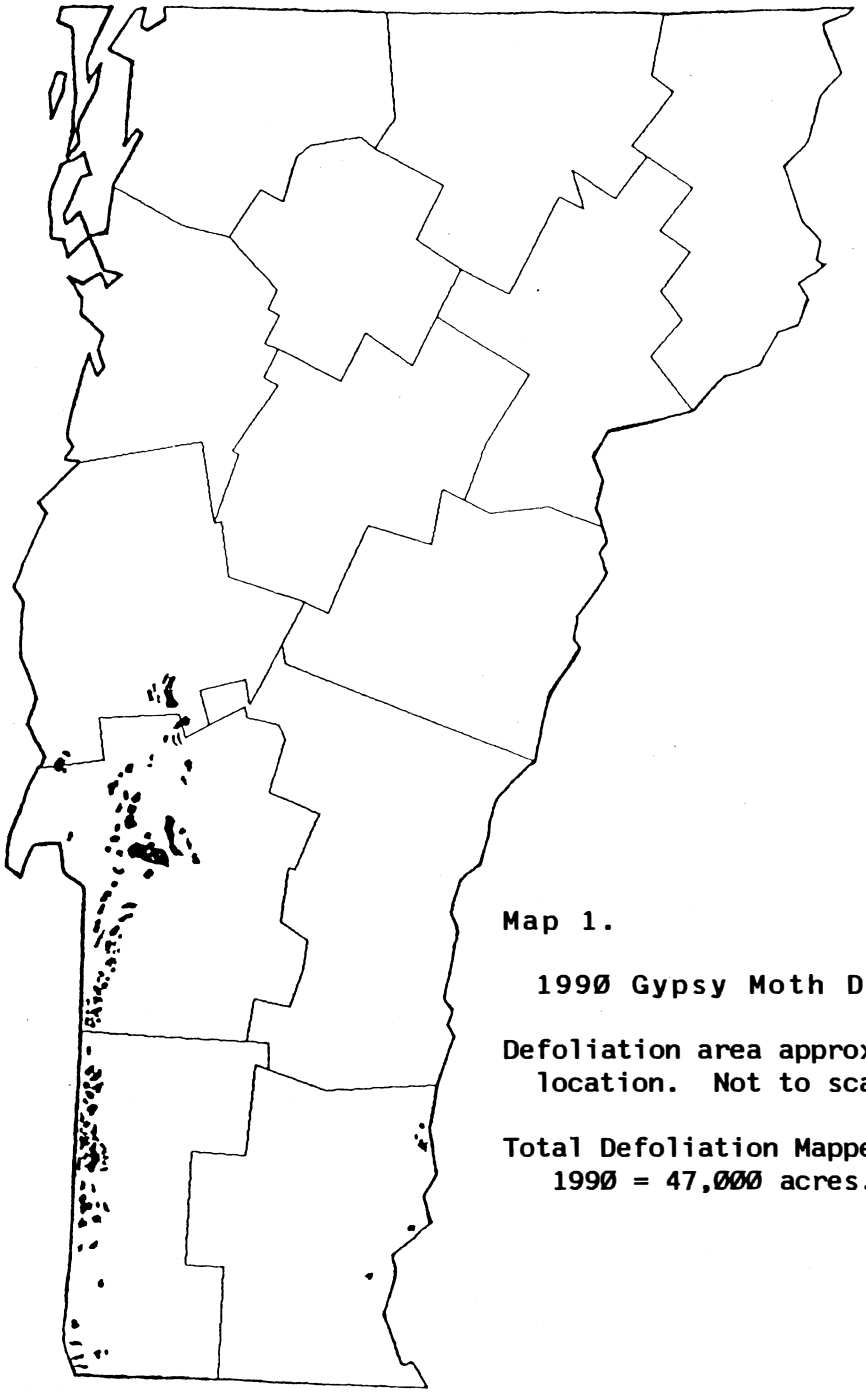
Although areas with high egg mass counts remain, populations have collapsed or failed to develop in much of the region. The fungal pathogen, *Entomophaga maimaiga*, is thought to be responsible for bringing the outbreak to a premature end over a large area. Heavy larval mortality was seen, beginning the third week of June. Larvae which survived often had thin or incomplete pupal cases. Mortality of females was apparently heaviest. Female moths were scarce in areas with many males, whose flight lasted longer than usual. Individual moths were seen flying as late as September. The general population decline is reflected in the data from focal area monitoring plots (Table 3).

Defoliation is expected in scattered locations in 1991. Surveys in Bennington and Rutland Counties indicate that populations are variable even within a single town. Egg masses are robust in some locations, but small and poorly formed in others. Counts made to date range from less than 1ØØ to over 7ØØØ per acre.

Maple Leaf Cutter, *Paraclemensia acerifoliella*, populations increased, with heavy damage occurring, particularly in central Windsor County. Together with anthracnose, pear thrips, and maple trumpet skeletonizer, this insect contributed to widespread browning of foliage that was mapped on 31ØØ acres, including a number of sugarbushes (Table 4, Map 2).

One 23 acre sugarbush in Hartford was aerially sprayed with Dipel 8AF at 16 b.i.u.s per acre. Insect counts were made before and after the application to monitor efficacy. Two 4-leaf cluster samples were taken from the mid-lower crown of ten codominant trees. The number of live larvae per leaf dropped by half from 1.9 pre-spray to Ø.9 post-spray (Table 5). Foliage protection was difficult to evaluate because of anthracnose. In general, foliage from the upper crown had only anthracnose damage, while foliage in the lower crown had moderate damage from maple leaf cutter.

1990
GYPSY MOTH DEFOLIATION
IN VERMONT



Map 1.

1990 Gypsy Moth Defoliation

Defoliation area approximate location. Not to scale.

Total Defoliation Mapped in 1990 = 47,000 acres.

Table 2. Mapped acres of defoliation by gypsy moth.

	Acres Defoliated		Acres Defoliated
Rutland County	23055	Bennington County	22500
Brandon	1200	Rupert	1500
Fair Haven	250	Sandgate	9300
Benson	500	Arlington	8850
Hubbardton	1900	Shaftsbury	500
Castleton	3350	Bennington	400
Ira	1725	Pownal	1950
Poultney	2430		
Wells	2250	Windham County	1400
Pawlet	3050		
Pittsford	2150	Bellows Falls	850
Proctor	900	Putney	300
Rutland Town	1000	Brattleboro	150
West Rutland	2350	Dummerston	100

Table 3. Gypsy moth counts from focal area monitoring plots 1986-1990.

Plot Location	# of Egg Masses 1986	1987	1988	1989	1990
Minards Pond	0	0	7	99	10
Fort Dummer	2	0	1	1	0
Handley Mountain	1	1	4	417	7
Perch Pond	0	115	226	168	1
Rocky Pond	0	6	53	>400	11
Petersburg	1	0	1	296	89
Tate Hill	0	0	6	498	5
Average	2	20	46	200	20

1. Total number in 15m diameter plots.
2. Average of 2 or 3 plots in 1986 and 2 plots in 1987 and 1988-1989.

Table 4. Acres of maple browning mapped in August caused by maple leaf cutter, anthracnose, maple trumpet skeletonizer, and pear thrips.

	Acres Mapped		Acres Mapped
Windsor County	2850	Rutland County	110
Cavendish	20	Tinmouth	50
Chester	30	Sherburne	20
Woodstock	450	Pittsfield	40
Bridgewater	200		
Barnard	300		
Pomfret	500	Windham County	130
Hartford	30		
Hartland	300	Townshend	50
Norwich	120	Brookline	40
Bethel	300	Grafton	40
Royalton	350		
Sharon	150		

Table 5. Average counts of maple leaf cutter larvae and damage before and after aerial spraying with Bt on 7/6.

	Pre-Spray (6/19)	Post-Spray (7/18)	
# Live Larvae/Leaf	1.8	0.9	p=.01
# Dead Larvae/Leaf	0.2	0.8	p=.01
Average % of Larvae Dead	10%	42%	p=.01
# of Cuts/Leaf	2.2	2.5	n.s.

Oak Leaf Tier, *Croesia semipurpurana*, was not observed causing any damage. However, moths were collected this year in pheromone traps (Table 6).

Saddled Prominent, *Heterocampa guttivata*, populations increased, with 2,800 acres of defoliation mapped from the air (Table 7, Map 3). Larval activity was heavy in scattered locations throughout the region, although much of the defoliation was confined to upper crowns. Little damage is expected next year. Very few pupae have been found in the soil, even in areas which had high larval populations. It is expected that a fungal pathogen is responsible for the collapse.

Satin Moth, *Leucoma salicis*, caused heavy damage to poplars and willows in early June. Damage was observed in widely scattered locations throughout the region. Cottonwoods in riparian areas were most commonly defoliated.

HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Birch Leaf Miner *Fenusa pusilla*	White Birch Grey Birch	Throughout	Only scattered damage.
Birch Leaf Folder *Ancylis discigerana*			Not observed.
Birch Skeletonizer *Bucculatrix canadensisella*			Not observed.
Bruce Spanworm *Operophtera bruceata*	Sugar Maple	Hartland	Moderate defoliation in a sugarbush. Associated with pear thrips.
Eastern Tent Caterpillar *Malacosoma americanum*	Apple Cherry	Throughout	Population continues to be down from 1988.
Elm Leaf Beatle *Pyrrhalta luteola*	Elm	Rutland	Adults observed.
Euonymus Caterpillar *Yponomeuta multipunctella*	Euonymus	Springfield	Ornamental.
European Snout Weevil *Phyllobius oblongus*	Walnut	Rockingham	Ornamental.

Table 6. Oak leaf tier in pheromone traps 1988-1990.

Location	# of Moths/Trap*		
	1988	1989	1990
Brattleboro	40	0	1.3
Brigham Hill	-	-	0.3
Rockingham	60	0	1.3
Rupert	-	0	0
Sandbar	-	-	0

* Average of three traps, except Rockingham in 1988.

Table 7. Mapped acreage of defoliation by saddled prominent.

	Acres Mapped		Acres Mapped
Bennington County	1530	Windham County	1250
Readsboro	350	Somerset	40
Stamford	900	Wilmington	900
Woodford	80	Halifax	200
Searsburg	200	Newfane	30
		Marlboro	80

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Fall Cankerworm *Alsophila pometaria*			Not observed.
Fall Webworm *Hyphantrea cunea*	Hardwoods	Throughout	Observed on cherries and apples in forest situations. Heavy on scattered roadside trees.
Forest Tent Caterpillar *Malacosoma disstria*			See narrative.
Green Striped Mapleworm *Anisota rubicunda*			Not observed.
Gypsy Moth *Lymantria dispar*			See narrative.
Half Winged Geometer *Phigalia titea*			Not observed.
Japanese Beetle *Popillia japonica*	Hardwoods	Ludlow	Golf course with grub damage to turf.
Large Aspen Tortrix *Choristoneura conflictana*			Not observed.
Linden Looper *Erranis tiliaria*			Not observed.
Locust Leaf Miner *Odontata dorsalis*			Not observed.
Maple Leaf Cutter *Paraclemensia acerifoliella*			See narrative.

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Maple Trumpet Skeletonizer *Epinotia aceriella*	Sugar Maple	Throughout	Very heavy in scattered locations, particularly Windsor County. See Maple Leaf Cutter.
Maple Webworm *Tetralopha asperatella*			Not observed.
Maple Petiole Borer *Caulocampus acericaulis*	Sugar Maple	Weston	Forest situation.
Mountain Ash Sawfly *Pristophora genicultata*			Not observed.
Pear Slug *Caliroa cerasi*	Cherry	Ludlow	Ornamental.
Pin Oak Sawfly *Caliroa sp.*			Not observed.
Saddled Prominent *Heterocampa guttivata*			See narrative.
Satin Moth *Leucoma salicis*			See narrative.
Solitary Leaf Roller *Sparganothis pettitana*	Sugar Maple	Rutland County	Associated with maple leaf cutter.
Spring Cankerworm *Paleacrita vernata*			Not observed.
Uglynest Caterpillar *Archips cerasivoranus*	Cherry	Stockbridge	Isolated infestation.

Softwood Defoliators

Hemlock Looper, *Lambdina sp.*, is thought to be responsible for defoliating 5-10 acres of hemlock in Vernon. Defoliation was first observed in July. Needle loss was more severe in the older foliage of upper crowns, however, some trees were completely brown by November. Samples are being analyzed by the Maine Forest Service.

Larch Casebearer, *Coleophora laricella*, caused less widespread damage this year than in 1989. However, 250 acres of tamarack in Rutland County (Clarendon) and 100 acres in Bennington County (Bennington and Dorset) were defoliated.

OTHER SOFTWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Arborvitae Leaf Miner *Argyresthia thuiella*	Arborvitae	Rutland	Less common than 1989.
European Pine Sawfly *Neodiprion sertifer*	Scots Pine	Weathersfield	Christmas trees.
Introduced Pine Sawfly *Diprion similis*	Scots Pine	Hubbardton	Numerous enough on Christmas trees to require control.
	White Pine	Windsor County	Observed occasionally.
Larch Casebearer *Coleophora laricella*			See narrative.
Larch Sawfly *Pristophora erichosonii*			Not observed.
Spruce Budworm *Choristoneura fumiferana*			Not observed.

OTHER SOFTWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Spruce Coneworm *Dioryctria reniculleloides*	White Spruce Fraser Fir	Rutland	Light damage to Christmas trees.
Spruce Webspinning Sawfly *Cephalacia fascipennis*	White Spruce	Sharon	Isolated nest in Christmas trees.

Sapsucking Insects, Midges, and Mites

Balsam Gall Midge, *Paradiplosis tumifex*, caused more widespread damage this year, with light damage seen in scattered Christmas tree plantations and forest stands throughout the region. In one plantation, sprayed with Diazinon AG5ØØ when growth was 3/4" long, sprayed trees averaged 1.9 galls per cm. of shoot, while unsprayed trees averaged 2.4 galls per cm..

Galls from infested trees in Weston were examined to determine whether *Dasineura balsamicola* was present. *D. balsamicola* was found in one-quarter of the galls.

Balsam Twig Aphid, *Mindarus abietinus*, was widespread again this year, with many Christmas tree growers spraying to prevent needle curling and sooty mold. Eggs were counted in two plantations in late March (Table 8).

Hemlock Woolly Adelgid, *Adelges tsugae*, was introduced to the state on tublings which had been maintained in New Jersey prior to outplanting in Stockbridge. Identification was confirmed by the Connecticut Agricultural Experiment Station. Approximately 14Ø-2ØØ tublings were planted on a cleared hilltop site in early May and early July. Some of the trees are known to have died shortly after planting. In mid-July, when the infestation was detected, 12Ø seedlings were pulled and destroyed. Ten percent of these were obviously infested with adelgid. A systematic survey was done in early September, when 9 infested and 11 non-infested seedlings were pulled and destroyed.

The chance for eradicating the infestation is good. The planting site is at a high elevation, where native hemlock does not occur in the surrounding forestland. Additional scouting surveys will be done in 1991 in and around the planting area.

To continue monitoring the state for other possible infestations, a subsample of the 1989 systematic survey plots was reexamined for hemlock woolly adelgid. Six of the thirty-eight original plots were revisited. No adelgids were detected (Map 4).

Pear Thrips, *Taeniothrips inconsequens*, caused more damage this year than in 1989. Overwintering soil counts, spring bud counts (Figure 2), and acres of damage mapped during aerial surveys (Table 9, Map 5) all increased from 1989.

Damage was negligible in most of Bennington, Rutland, and Windham Counties where green-up occurred very quickly in late April. However heavy damage did occur in Windham County in isolated mid-elevation sites. More widespread (mostly moderate) damage occurred in Windsor County, where green-up at mid- to upper-elevations was delayed due to a long cold period in early May. Aerial survey results may not accurately reflect actual conditions, because defoliation was difficult to detect against the delayed green-up of late-flushing species.

Refoliation of sugar maple was well underway the week of June 18. Complete refoliation occurred where individual trees were heavily damaged. However, many moderately damaged maple stands and sugarbushes in Windsor County did not refoliate. Thin crowns and brown leaves from thrips damage became more visible as the season progressed (see Maple Leaf Cutter).

Figure 2. Average thrips counts in buds of sugar maple regeneration 1986-1990. Average of 2 sugarbushes in 1986 and 6 sugarbushes in 1987-1990 (100 buds/sugarbush).

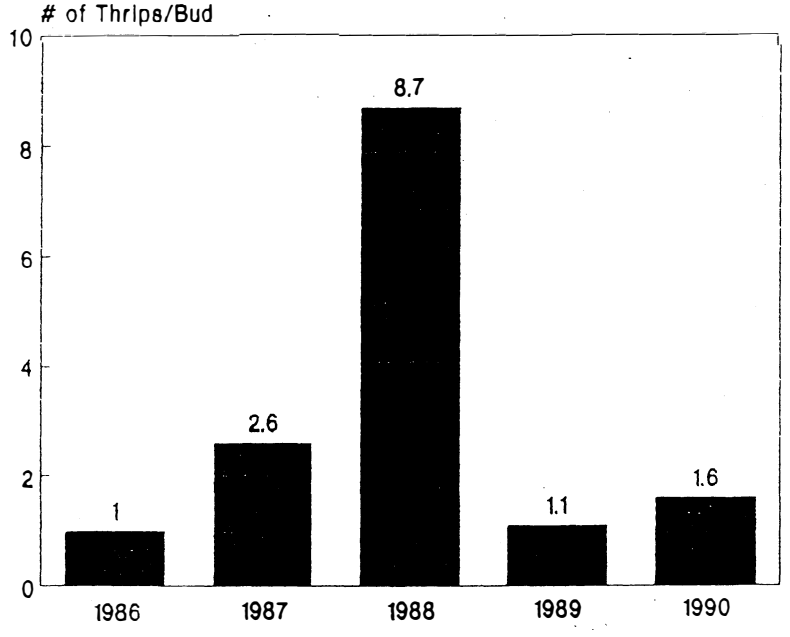


Table 8. March egg counts and subsequent damage by balsam twig aphid in two plantations.

Location	# viable eggs/ cm. of shoot	% of eggs which were viable	Needle Damage Observed
Dummerston	.24	64%	moderate
Whitingham	.Ø4	31%	light

Table 9. Mapped acres of damage by pear thrips.

	Acres Mapped		Acres Mapped
Rutland County	125	Windham County	325Ø
Clarendon	4Ø	Brattleboro	35Ø
Hubbardton	25	Dummerston	2ØØ
Pawlet	1Ø	Guilford	25Ø
Poultney	5Ø	Halifax	7ØØ
		Marlboro	75Ø
		Putney	15Ø
		Townshend	2ØØ
		Westminster	165Ø

In addition to sugar maple, damage to red oaks and black cherries was observed in Windham County. In red oak, the damage was associated with anthracnose. Black cherry damage resulted in normal-looking leaves being dropped from the tree.

Pine Bark Adelgid, *Pineus strobi*, was unusually heavy on white pine throughout the region. Most commonly affected were ornamentals and overstocked forest trees. In some areas, severe chlorosis of 1989 needles occurred early in the season associated with this insect.

Spruce Spider Mite, *Oligonychus ununguis*, damage, from 1989 feeding, was seen in widely scattered locations on spruce and fir Christmas trees early in the season. In general, infested plantations had more hatched eggs than current eggs, indicating declining populations. Scattered light damage, from 1990 feeding, was observed on hemlock and spruce.

OTHER SAPSUCKING INSECTS, MIDGES & MITES

INSECT	HOST(S)	LOCALITY	REMARKS
Aphids *Periphyllus sp.*	Sugar Maple	Brandon	Numerous, with heavy honeydew, on ornamentals which are routinely sprayed with carbaryl.
Aphids *Cinara sp.*	Blue Spruce	Brattleboro	Heavy on ornamentals.
Balsam Gall Midge *Paradiplosis tumifex*			See narrative.
Balsam Twig Aphid *Mindarus abietinus*			See narrative.
Balsam Woolly Aphid *Adelges piceae*			Not observed.
Cooley Spruce Gall Aphid *Adelges cooleyi*	Douglas Fir White Spruce Blue Spruce	Throughout	Douglas fir damage in scattered locations. Lighter than previous years.
Eastern Spruce Gall Aphid *Adelges abietis*	Red Spruce White Spruce	Throughout	Continues to be common on white spruce Christmas trees, with heavy damage to scattered individuals.

OTHER SAPSUCKING INSECTS, MIDGES & MITES

INSECT	HOST(S)	LOCALITY	REMARKS
Hemlock Woolly Adelgid *Adelges tsugae*			See narrative.
Leaf Stem Gall Aphid *Phylloxera caryaecaulis*	Hickory	Springfield	Ornamentals.
Oystershell Scale *Lepidosaphes ulmi*	Beech	Wilmington	Noticeable damage in a forested area mapped during aerial surveys.
Pear Thrips *Taeniothrips inconsequens*			See narrative.
Pine Bark Adelgid *Pineus strobi*			See narrative.
Pine Needle Midge *Contarinea baeri*			Not observed.
Pine Spittlebug *Aphrophora parallela*	White Pine Scots Pine	Throughout	Heavy again in 1990. Moderate shoot mortality on Scots Pine Christmas trees in Putney from 1989 feeding.
Root Aphid *Prociphilus americanus*			Not observed.
Spruce Spider Mite *Oligonychus ununguis*			See narrative.

Bud, Shoot and Stem Insects

White Pine Weevil, *Pissodes strobi*, continued to cause widespread terminal shoot mortality in conifers. Dimilin, formulated with propylene glycol and superior oil, was tested on white pine by Christmas tree growers in Whitingham and Shrewsbury, in cooperation with the Maine Forest Service. In both plantations, 100% control was achieved. In the Whitingham site, 6% of the leaders had been damaged in 1989, and wild trees adjacent to the treated area were damaged by weevil in 1990. In the Shrewsbury site, additional Scots pines were treated with lindane. No weevil damage occurred to the lindane-treated trees either.

OTHER BUD, SHOOT & STEM INSECTS

INSECT	HOST(S)	LOCALITY	REMARKS
Allegheny Mound Ant *Formica exsectoides*	White Spruce	Athens	Christmas trees.
Black Walnut Curculio *Conotrachelus retentus*	English Walnut	Rockingham	Persistent infestation in small orchard.
Broad Necked Root Borer *Prionus laticollis*	Oak	Springfield	Ornamentals.
Horned Oak Gall *Callirhytis cornigera*	Red Oak	Barnard	Regneration.
Northern Pine Weevil *Pissodes approximatus*			Not observed.
Pales Weevil *Hylobius pales*			Not observed.
Poplar Gall Saperda *Saperda inornata*	Quaking Aspen	Dummerston	Heavy infestation of 10-12' regeneration in aspen clearcut.
Round Headed Apple Tree Borer *Saperda candida*	Apple Mountain Ash	Reading Weston	Ornamentals.

OTHER BUD, SHOOT & STEM INSECTS

INSECT	HOST(S)	LOCALITY	REMARKS
Sugar Maple Borer *Glycobius speciosus*	Sugar Maple	Cavendish Bridgewater	Sugarbush. Many old injuries in sawtimber stand.
White Pine Weevil *Pissodes strobi*			See narrative.
Zimmerman Pine Moth *Dioryctria zimmermanni*	Scots Pine	Springfield	Heavy damage to ornamentals.

BARK BEETLES

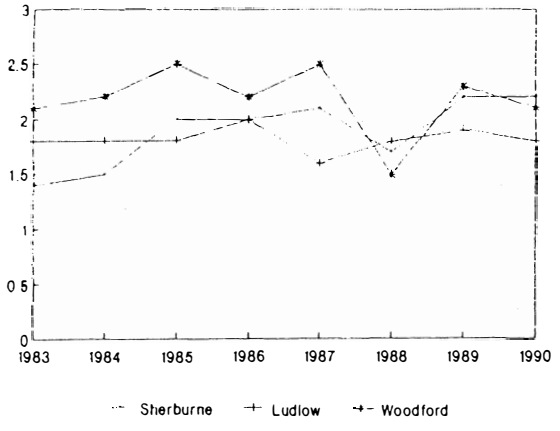
INSECT	HOST(S)	LOCALITY	REMARKS
Bronze Birch Borer *Agrilus anxius*	White Birch	Springfield	Recent transplants.
Elm Bark Beetles *Hylurgopinus rufipes* *Scolytus multistriatus*	American Elm	Widespread	See Dutch Elm Disease.
Pine Engraver *Ips pini*	White Pine	Throughout	Associated with decline and mortality on wet sites and where planted too deep.
Red Turpentine Beetle *Dendroctonus valens*	White Pine	Jamaica Springfield	Associated with white pine blister rust or recent cutting.
White Pine Bark Miner *Marmara fasciella*	White Pine	Athens	Associated with mortality of suppressed regeneration.

STEM DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Balsam Fir Twig Abnormality *Sclerotinia kerneri*	Balsam Fir	Mt. Holly	Causing dieback.
Beech Bark Disease *Cryptococcus fagisuga* and *Nectria coccinea* var. *faginata*	Beech	Throughout	Steady at low levels in monitoring plots (Fig. 3). Scattered dieback and chlorosis throughout.
Caliciopsis Canker *Caliciopsis pine*	White Pine	Throughout	Associated with overstocked or off-site trees.
Canker Rot *Cerrena unicolor*	Sugar Maple	Woodstock	Associated with sudden mortality of a shade tree stressed by drought and a girdling root.
Cytospora Canker *Cytospora kunzei*	Spruce	Widespread	Less common than other years.
Diplodia Shoot Blight *Sphaeropsis sapinea*	Red Pine	Throughout	Scattered through a 15 year old plantation.
Dutch Elm Disease *Ceratocystis ulmi*	Elm	Throughout	Flagging common by late June.
Fireblight *Erwinia amylovora*	Cherry	Sunderland	Isolated infection.
Hypoxylon Canker *Hypoxylon pruinatum*	Quaking Aspen	West Rutland Pittsford	Heavy damage.
Oak Wilt *Ceratocystis fagacearum*	Oaks	Absent	No suspects seen by trained observers during aerial flights.

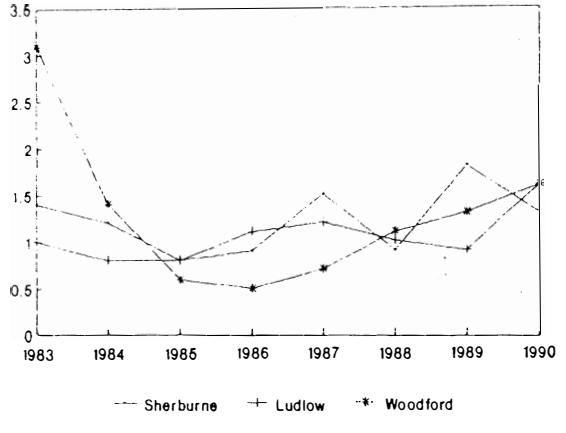
Figure 3. Summary of beech bark disease monitoring plots 1983-1990.

Average Tree Condition



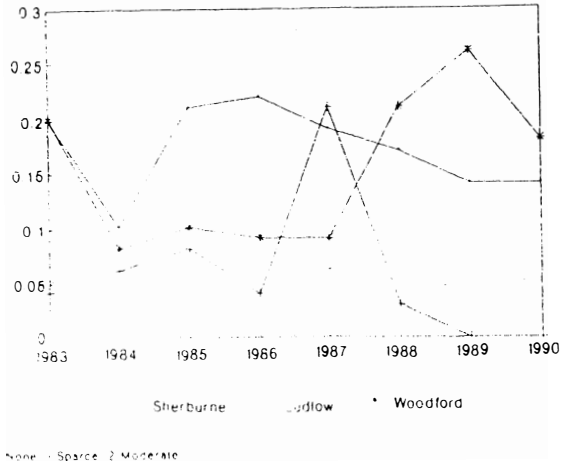
1 Good, 2 Fair, 3 Poor, 4 Dead

Average Wax Cover



0 None,1 Trace,2 Light,3 Mod,4 Heavy

Average Nectria Fruiting



OTHER STEM DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Sapstreak *Ceratocystis coerulescens*	Sugar Maple	Guilford Bethel	Staining seen associated with mortality in recently thinned stands.
Scleroderris Canker *Gremmeniella abietina*			Not observed.
Smoth Patch *Dendrothele macrodens*	Ash	Woodstock Barnard	Slow-growing trees.
Verticillium Wilt *Verticillium albo-atrum*			Not observed.
White Pine Blister Rust *Cronartium ribicola*	White Pine	Throughout	Scattered mortality in pole-sized stand in Westminster.

Foliage Diseases

Anthracnose was widespread in the region this year. Most symptoms showed up following the cool, wet weather in May, or following a rainy period in mid-August. High levels of anthracnose in 1989 left plenty of fungus inoculum to take advantage of wet conditions.

Maple Anthracnose, caused by *Gloeosporium sp.*, caused scattered browning earlier in the season, especially in Windham County. Damage was much more extensive in mid-August. Browning by anthracnose and several insects was mapped on 3100 acres (see Maple Leaf Cutter).

Oak Anthracnose, caused by *Apiognomonia quercina*, was widespread, with symptoms showing up in early June. Most of the damage observed was in the Connecticut valley. Damage was irregular, with scattered trees being completely browned, while neighbors were browned at the top only or not at all. Symptomatic trees refoliated by mid-July.

Sycamore Anthracnose, caused by *Apiognomonia venata*, was unusually severe. Complete defoliation and scattered shoot mortality were widespread particularly in Bennington and Windham Counties. Refoliation began by mid-June, but sycamores remained tufted throughout the season.

Other anthracnose diseases seen in 1990 included *Gloeosporium betulae-luteae* on yellow birch in Bennington and *Gnomoniella carpina* on hophornbeam in Windsor County.

Lophodermium Needlecast, caused by *Lophodermium pinastri*, caused heavy damage to Scots pine Christmas trees in scattered locations. In two plantations, where needlecast was associated with winterburn, damage was so severe that some trees were culled. Lophodermium was also seen causing premature needlecast on white pine in Woodstock.

OTHER FOLIAGE DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Anthracnose *Gloeosporium* spp.			See narrative.
Apple Scab *Venturia inequalis*	Apple Mountain Ash	Norwich Chester Westminster	
Bulls Eye Spot *Cristulariella moricola*	Boxelder Norway Maple	Norwich Windsor	Not affecting adjacent sugar maples.

OTHER FOLIAGE DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Cyclaneusma Needlecast *Cyclaneusma minus*	Scots Pine	Putney Pownal	Moderate defoliation of Christmas trees.
Juniper Blight *Cercospora sequoiae-juniperi* *Phomopsis juniperovona*		Chester Ludlow Hartford	Damage to nursery and landscape shrubs.
Powdery Mildew *Microsphaera syringae*	Lilac	Norwich	Heavy infection.
Rhabdocline Needlecast *Rhabdocline pseudotsugae*	Douglas Fir	Springfield	Observed in one Christmas tree plantation. Down from previous years.
Rhizosphaera Needlecast *Rhizosphaera kalkhoffi*	White Spruce	Springfield Dummerston Baltimore	Light damage in Christmas tree plantations.
Septoria Leaf Spot *Septoria mussiva*	Balsam Poplar	Widespread	Heavy defoliation in mid August. Some refoliation.
Swiss Needlecast *Phaeocryptopus gaumani*	Douglas Fir	Brattleboro Springfield	Moderate damage.
Willow Scab *Venturia saliciperda*	Willow	Widespread	Heavy defoliation, especially in Clarendon.

ROOT ROTS

DISEASE	HOST(S)	LOCALITY	REMARKS
Annosus Root Rot *Heterobasidion annosum*	Red Pine	Guilford	Several infection centers in an over-stocked stand.
Brown Root Butt Rot *Phaeolus schweinitzii*	White Pine	Wallingford	Causing butt rot in healthy, understocked white pine.
	Red Spruce	Weston	Causing pockets of windthrow on a wet site.
Shoestring Root Rot *Armillaria mellea*	Norway Spruce	Woodstock	Occasional dieback and mortality.
	Balsam Fir	Shrewsbury	Scattered individuals.
	White Pine	Castleton	Mortality in one clump of trees.

DIEBACKS DECLINES & ENVIRONMENTAL DISEASES

ASH DIEBACK and mortality remains common, continuing at steady levels. Ash dieback is particularly noticeable in hedgerow trees.

BIRCH DECLINE is still noticeable at upper elevations in Windsor County, but symptoms are improving in most of the region. Low levels of birch leaf miner in recent years have reduced the stress on birch.

DROUGHT conditions in 1988 continue to cause losses, particularly among landscape trees. Ornamental maples with girdling roots, sugarbushes on shallow sites, and trees disturbed by grade changes or wounding developed new dieback or died in 199Ø. Drought effects are known to persist for several years following a dry year.

EDEMA symptoms were seen on the needles of balsam fir Christmas trees growing on wet sites in Bennington and Springfield. The wet spring of 1989 is thought to be responsible for the symptoms, which were first observed during winter 1989-9Ø.

FROST INJURY was observed on maples at higher elevations in Mendon, Sherburne, Rupert, and Sunderland. Balsam fir Christmas trees in Windham had light damage. Many needles were constricted in the middle, where young tissue was weakened by cold temperature. Later on, needles with heavier damage broke at the constriction.

HERBICIDE INJURY was seen in several locations. Roundup injured Douglas fir Christmas trees in two plantations, causing pockets of mortality. Dicamba injured ornamental spruce on a golf course. Ronstar injured a variety of species in a small nursery. Princep is thought to be the cause of chlorosis in a white spruce Christmas tree plantation.

IMPROPER PLANTING continues to be a source of dieback and mortality. In some cases, symptoms have only recently shown up on trees that were transplanted several years ago. Again, it is suspected that the dry conditions two years ago contributed to the decline. Among the situations encountered were white spruce Christmas trees, town street trees, and ornamentals planted too deep. The scattered occurrence of mortality and dieback associated with girdling roots suggests that more careful planting in the past would have increased longevity.

LARCH DECLINE was observed in Clarendon, Tinmouth, and Danby in stands that have had mortality in the past. Recent defoliation by larch casebearer is probably responsible for the decline.

MAPLE DECLINE continues to be a concern. Monitoring continued in plots established as part of the North American Sugar Maple Decline Project.

In general, maples continued to appear healthier than normal. Two consecutive years of plentiful rainfall and limited defoliation contributed to dense, green leaves. However, dieback and mortality occur in forest stands and sugarbushes where stresses have occurred. Hygrading left an unthrifty stand of trees in Newfane, where dieback is high. In a sugarbush in Bethel, a shallow site, past overtapping, and thrips defoliation contributed to scattered mortality. In a Guilford sugarbush, overtapping and sapstreak from logging injuries led to mortality as well. Street trees and ornamentals continue to be in poor condition due to drought, poor site, wounding, and improper planting.

PHYSIOLOGICAL CONDITIONS are thought to be the cause of premature shedding of last year's green needles from white spruce at budbreak. Symptoms occurred on Christmas trees in scattered locations. Affected trees were often genetically related. Similar symptoms were seen several years ago in New Brunswick.

WET FEET was the cause of chlorosis and mortality in white pine stands, which occurred on scattered wet sites throughout the region. Pine engravers were often seen on recently dead trees. Mortality, chlorosis, and frost heaving also occurred to white spruce Christmas trees planted on a wet site in 1989. Several years of above average rainfall contributed to the wet conditions.

WINTERBURN symptoms were widespread, brought on by cold December temperatures follows by warm weather in January. Christmas tree plantations were particularly hard hit. Scots pine, white spruce, balsam fir, and fraser fir were among the species affected. Although new growth developed as normal, some short-needled Scots pine were culled, especially where Lophodermium needlecast occurred as well.

ANIMAL DAMAGE

ANIMAL	SPECIES DAMAGED	LOCALITY	REMARKS
Deer	Many	Throughout	Browse heavy in many locations
Mouse	Hardwoods	Windsor County	Severe damage in scattered high elevation sites. Bark chewed off root collar of mature beech trees on Okemo.
Porcupine	Beech Maple	Sandgate	Damage heavy in places. Elsewhere, very little damage.
Sapsucker	Many	Throughout	Damage more common than usual.
Squirrel	Tubing	Poultney	Heavy damage.

1990 PEST CONDITIONS REPORT WORKSHEET

PEST (COMMON NAME): ~~Lymantria~~ Gypsy Moth

(SPECIFIC NAME): Lymantria dispar (L.)

HOST: OAK

PRESENT CONDITION:

AREA (TOTAL ACRES): 3882.

LOCATION: Green Mountain National Forest-
2555 Middlebury R.D 1327 Manchester R.D.

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

Moderate (31-60% defoliation) - 507

Severe (>60% defoliation) - 945

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: 1990 was the peak year for the gypsy moth outbreak on GMNF

FUTURE: Expecting the population to decline for 1991.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: Suppression project conducted in 1990, 3202 Acres treated on Middlebury RD. Foray 48B(BT) was applied aerially as an undiluted material at 64 oz/A and 24 BIU. Approximate cost was $19.00 per Acre.

- Gypsy Moth defoliation was light (<30%) on the Manchester RD.

- Presence of disease (virus and/or fungus) in the population.

(2)

1990 PEST CONDITIONS REPORT WORKSHEET

PEST (COMMON NAME): Pear Thrips

(SPECIFIC NAME): Taeniothrips inconsequens (UZEL)

HOST: Maple

PRESENT CONDITION:

AREA (TOTAL ACRES): ~~75~~ ~~386~~ 324

LOCATION: Green Mountain Nat. For.

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

Severe (>60% defoliation) — ~~75~~ 63 Ac

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Pear thrips have not been causing much damage the last 2 yrs. ('89-'90).

FUTURE: Expect that ~~damage~~ will remain low for 1991

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

NONE

COMMENTS:

1990 PEST CONDITIONS REPORT WORKSHEET

PEST (COMMON NAME): Saddled prominent

(SPECIFIC NAME): Heterocampa guttivitta (Walker)

HOST: Beech - Maple

PRESENT CONDITION:

AREA (TOTAL ACRES): 75

LOCATION: Green Mountain National Forest (Bald Mountain)

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

Light (<30% defoliation) - 75

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Saddled prominent has continued to stay at low population levels for 1990.

FUTURE: 1991 populations should be similar to 1990.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

NONE.

COMMENTS: